

Prevention and Control Methicillin-Resistant *Staphylococcus aureus* (MRSA)

National Clinical Guideline No. 2

Summary

National Clinical Effectiveness Committee (NCEC)

The National Clinical Effectiveness Committee (NCEC) was established as part of the Patient Safety First Initiative in September 2010. The NCEC's mission is to provide a framework for national endorsement of clinical guidelines and audit to optimise patient and service user care. The NCEC has a remit to establish and implement processes for the prioritisation and quality assurance of clinical guidelines and clinical audit so as to recommend them to the Minister for Health to become part of a suite of National Clinical Guidelines and National Clinical Audit.

National Clinical Guidelines are "systematically developed statements, based on a thorough evaluation of the evidence, to assist practitioner and service users' decisions about appropriate healthcare for specific clinical circumstances across the entire clinical system". The implementation of clinical guidelines can improve health outcomes, reduce variation in practice and improve the quality of clinical decisions.

The aim of National Clinical Guidelines is to provide guidance and standards for improving the quality, safety and cost effectiveness of healthcare in Ireland. The implementation of National Clinical Guidelines will support the provision of evidence based and consistent care across Irish healthcare services.

The oversight of the National Framework for Clinical Effectiveness is provided by the NCEC. The NCEC is a partnership between key stakeholders in patient safety and its Terms of Reference are to:

- Apply criteria for the prioritisation of clinical guidelines and audit for the Irish health system
- Apply criteria for quality assurance of clinical guidelines and audit for the Irish health system
- Disseminate a template on how a clinical guideline and audit should be structured, how audit will be linked to the clinical guideline and how and with what methodology it should be pursued
- Recommend clinical guidelines and national audit, which have been quality assured against these criteria, for Ministerial endorsement within the Irish health system
- Facilitate with other agencies the dissemination of endorsed clinical guidelines and audit outcomes to front-line staff and to the public in an appropriate format
- Report periodically on the implementation of endorsed clinical guidelines.

It is recognised that the health system as a whole, is likely to be able to effectively implement and monitor only a small number of new National Clinical Guidelines each year. Not all clinical guidelines will be submitted for national endorsement and clinical guideline development groups can continue to develop clinical guidelines using an evidence based methodology in response to the needs of their own organisations.

Information on the NCEC and endorsed National Clinical Guidelines is available on the Patient Safety First website at www.patientsafetyfirst.ie

Guideline Development Group

The Prevention and Control of Methicillin-resistant *Staphylococcus aureus* (MRSA) National Clinical Guideline was developed by the Royal College of Physicians Ireland (RCPI) Clinical Advisory Group on healthcare associated infections (HCAI) - Subgroup MRSA Guideline Committee.

Using this National Clinical Guideline

This document is intended to be relevant to all healthcare staff involved in the care of patients, residents or clients who may be at risk of or have MRSA in acute hospitals, nursing homes/long stay residential units and the community.

This summary version, in addition to the full version, which provides more detail on the National Clinical Guideline, is available on the website www.patientsafetyfirst.ie

Disclaimer

The Clinical Guideline Development Group's expectation is that healthcare professionals will use clinical judgment and knowledge in applying the general principles and recommendations contained in this document. Recommendations may not be appropriate in all circumstances and decisions to adopt specific recommendations should be made by the practitioner taking into account the circumstances presented by individual patients and available resources.

Antibiotic stewardship is the subject of on-going research and debate. Local antibiotic susceptibility data should be used to guide treatment having due regard to the clinical judgement of the prescriber and the individual circumstances of each patient. Therapeutic options should be discussed with a clinical microbiologist or infectious disease physician on a case-by-case basis as necessary.

Table of Contents

1.0 Definition of MRSA and scope of the National Clinical Guideline	5
1.1 Definition of MRSA	5
1.2 Scope of the National Clinical Guideline	5
1.3 Grading of recommendations	5
2.0 National Clinical Guideline Recommendations	7
2.1 Prevention and control	7
2.2 Management	12
2.3 Surveillance	14
2.4 Evaluation and audit	14
3.0 National Clinical Guideline	15
3.1 Background	15
3.2 Using this National Clinical Guideline	15
3.3 Aim of the MRSA National Clinical Guideline	15
3.4 Methodology	16
3.5 Economic impact report	17
3.6 Guiding principles for the National Clinical Guideline	17
3.7 Implementation and dissemination	17
3.8 Roles and responsibilities	17
3.9 Key audit criteria	18
Abbreviations	19

1.0 Definition of methicillin-resistant *Staphylococcus aureus* (MRSA) and scope of the National Clinical Guideline

1.1 Definition of MRSA

Staphylococcus aureus (*S. aureus*) commonly colonises the skin and nose. Methicillin-resistant *Staphylococcus aureus* (MRSA) infection is caused by a strain of bacteria that has become resistant to the antibiotics commonly used to treat ordinary staphylococcal infections.

In the right setting MRSA can cause severe and at times fatal infections such as bloodstream infection (BSI), infective endocarditis, pneumonia and skin and soft tissue infections (SSTI).

1.2 Scope of the National Clinical Guideline

The guideline is relevant to and has been developed for all healthcare staff involved in the care of patients, residents or clients who may be at risk of or may have MRSA in acute hospitals, obstetrics and neonates, nursing homes/long stay residential units and the community. Such members of staff include medical practitioners, nurses, midwives, healthcare assistants, biomedical scientists, pharmacists and allied healthcare professionals. This guideline acknowledges changes in epidemiology, i.e. the emergence of community-acquired MRSA (CA-MRSA).

The public and patients will find this guideline of interest as it outlines the general and specific measures required to prevent and control MRSA and how these can and should be incorporated into quality measures to safeguard the quality of patient care.

The guideline does not address the following:

- i) Issues relating to antibiotic resistance, including MRSA in the agri-farming sector
- ii) The challenges of developing new drugs for the treatment of invasive MRSA infection
- iii) The potential implications of laboratory modernisation which will include rationalisation and the centralisation of some services, including the laboratory diagnosis of and screening for MRSA.

1.3 Grading of recommendations

The recommendations are followed by a grade. This is a consensus grade agreed by the MRSA guideline development group reflecting the strength of the evidence supporting the recommendation, and discussion of the evidence amongst the MRSA guideline development group. The system, as used in the 2005 guidelines was felt to best meet the needs of the guideline and the guideline development group, given the absence of randomised controlled trials (RCTs) in many of the areas covered.

The grades used throughout the guideline document are as follows:

- Grade A** Evidence from a meta-analysis of RCTs, or from at least one RCT.
- Grade B** Evidence based on one controlled trial without randomisation, a quasi-experimental study, or extrapolated from RCTs.
- Grade C** Evidence from comparative studies, correlation studies, case control studies or extrapolated from category A or B.
- Grade D** Evidence from expert committees, reports or opinions, the clinical experience of respected authorities, and the conclusions of the guideline development group.

2.0 National Clinical Guideline Recommendations

The recommendations are numbered 1 to 53 as follows:

Prevention and control (Recommendations 1-32)

- Screening
- Infection prevention and control measures in the acute hospital setting
- MRSA in the non-acute healthcare setting
- MRSA in obstetrics and neonates
- Community-associated MRSA
- MRSA decolonisation
- Antimicrobial stewardship and the prevention and control of MRSA
- Occupational health aspects of MRSA

Management (Recommendations 33-45)

- Treatment and prophylaxis

Surveillance (Recommendations 46-50)

Evaluation and audit (Recommendations 51-53)

The recommendations are linked to the best available evidence and/or expert opinion using the grades for recommendations outlined in Section 1.3.

A rationale for the recommendations is outlined and practical guidance to support the delivery of the recommendations is provided in the full version document available on the website www.patientsafetyfirst.ie

Prevention and control of MRSA is a multidisciplinary task, involving surveillance, patient screening, decolonisation, isolation and cohorting of patients, environmental cleaning, antimicrobial stewardship, maintaining adequate staffing levels and hand hygiene. The prevention and control of MRSA are the responsibility of all those who work in the healthcare sector and not just those professionally involved in infection prevention and control.

2.1 Prevention and control

The following are responsible for implementation of the recommendations 1-32: clinical teams, senior management and the Infection Prevention and Control Team (IPCT). Public health professionals and medical scientists have some specific roles as outlined in the relevant recommendations.

Screening

Recommendation 1

Continue with targeted MRSA screening (i.e. patients at risk of acquiring MRSA), and not universal screening (i.e. all patients on admission to acute hospitals), pending further data on its efficacy and feasibility. **Grade D**

Recommendation 2

All patients (in-patients, out-patients and other patients in the community) identified with MRSA should be informed as soon as possible of their MRSA status, which should be documented in the patients' clinical notes and information should be provided about eradication/treatment options, as appropriate. **Grade D**

Infection prevention and control measures in the acute hospital setting**Recommendation 3**

Healthcare facilities should have an infection prevention and control programme which incorporates:

- Monitoring for problems, including outbreaks of infection
- Routinely assessing all residents for their risk of acquisition or transmission of infection
- Education of employees in infection prevention and control precautions
- Policy and procedure development and review
- Monitoring of care practices
- Occupational health
- Antibiotic stewardship. **Grade D**

Recommendation 4

The health service provider should take steps to prevent patient overcrowding and to maintain adequate staffing levels, in order to minimise the risk of MRSA transmission. **Grade B**

Recommendation 5

Staff members of all grades should receive appropriate training and education on standard precautions, hand hygiene and the appropriate use of personal protective equipment (PPE) etc. i.e. on induction and annually. **Grade B**

Recommendation 6

Where single rooms or a dedicated isolation unit are not available, colonised patients may be cohorted in designated areas with designated staff according to local risk assessment and the facilities available. **Grade C**

Recommendation 7

Hand hygiene should be carried out according to the World Health Organization (WHO) 5 moments of hand hygiene:

- Before patient contact
- Before aseptic task
- After body fluid exposure risk
- After patient contact
- After contact with patient surroundings. **Grade A**

Recommendation 8

Hand hygiene should be carried out regularly by patients themselves. **Grade C**

Recommendation 9

Patients/residents/visitors should be encouraged to decontaminate their hands at regular intervals with assistance given if necessary. **Grade C**

Recommendation 10

A risk assessment should be undertaken on activities undertaken in a patient's room and appropriate PPE selected. **Grade C**

MRSA in the non-acute healthcare setting

Recommendation 11

Good communication between healthcare facilities is essential to prevent and control MRSA. Healthcare facilities should be informed on admission and discharge of recent MRSA screening results, decolonisation treatments received and any requirement for post decolonisation screening. This should be included in the transfer documentation. **Grade D**

Recommendation 12

Good communication when discharging patients home with MRSA between hospitals and carers or family members, community and public health nurses, and general practitioners is essential in minimising spread. **Grade D**

Recommendation 13

Non-acute healthcare facilities should have an infection prevention and control programme which incorporates:

- Monitoring for problems, including outbreaks of infection
- Routinely assessing all residents for their risk of acquisition or transmission of infection
- Education of employees in infection prevention and control precautions
- Policy and procedure development and review
- Monitoring of care practices
- Occupational health
- Antibiotic stewardship. **Grade D**

Recommendation 14

Hand hygiene should be carried out according to the World Health Organization (WHO) 5 moments of hand hygiene:

- Before patient contact
- Before aseptic task
- After body fluid exposure risk
- After patient contact
- After contact with patient surroundings. **Grade A**

Recommendation 15

Standard precautions are advised for the care of all residents of long-term care settings regardless of their MRSA status. **Grade B**

Recommendation 16

All residents of long-term care setting should be encouraged to practice good hygiene and should be assisted with this if required. **Grade C**

MRSA in obstetrics and neonates

Recommendation 17

Neonates in high risk units should be screened for MRSA, similar to all high risk patients, on admission and weekly thereafter. Screening in neonates <28 days old should include the umbilical site, in addition to other recommended sites. **Grade B**

Recommendation 18

If MRSA carriage is detected in a pregnant woman during the antenatal period, decolonisation is recommended before delivery. A standard decolonisation regimen including topical nasal mupirocin should be considered between 35-37 weeks gestation, and earlier if risk of preterm birth. **Grade D**

Recommendation 19

If a lactating mother has known MRSA mastitis, the mother can usually continue to breastfeed a healthy term baby in the community and receive antibiotic therapy, unless the antibiotics prescribed are contraindicated in lactation. **Grade C**

Community-associated MRSA (CA-MRSA)**Recommendation 20**

Patients with CA-MRSA in the following categories should be reported to the Medical Officer of Health (MoH)/Director of Public Health (DPH):

- Clusters/outbreaks of SSTI
- Cases with severe invasive disease or cases resulting in death
- Cases in at-risk groups such as healthcare workers or those involved in a gym or close contact sports
- Cases in a closed community where there may be potential for onward transmission (e.g. prison, military camps, nursing home). **Grade D**

Recommendation 21

Screening to detect asymptomatic colonisation in household contacts is generally not recommended unless advised by a clinical microbiologist or public health specialist.

Post-decolonisation screening is not recommended routinely for all cases but is advisable if:

- The case is at high-risk of developing infection, e.g. in-dwelling device or immunocompromised
- There are ongoing infections occurring in a household or a well-defined closely associated cohort
- The case is a risk to others e.g. a healthcare worker, household contact of a healthcare worker or a carer of at-risk people. **Grade D**

Recommendation 22

Decolonisation for CA-MRSA should be considered when individuals or their household contacts:

- have recurrent CA-MRSA infections
- are a healthcare worker or carer
- are at high risk of developing CA-MRSA infection e.g. in-dwelling device or immunocompromised
- when there are ongoing MRSA infections occurring in a well defined closely-associated cohort (e.g. prison inmates, sports club). Decolonisation of neonates (< 2 months) should not be commenced in the community unless specifically recommended by a clinical microbiologist or infectious diseases physician. **Grade D**

Decolonisation of neonates (< 2 months) should not be commenced in the community unless specifically recommended by a clinical microbiologist or infectious diseases physician. **Grade D**

MRSA decolonisation**Recommendation 23**

MRSA decolonisation is not sufficiently effective to warrant routine use in all colonised patients. **Grade A**

Recommendation 24

Excessive use of mupirocin should be avoided as this will select for resistance. **Grade B**

Recommendation 25

Decolonisation may be considered in certain cases but the likely success or impact of such therapy should be risk assessed to evaluate the aim, the required agents and whether it is likely to be successful. **Grade C**

Recommendation 26

An attempt at decolonisation may be considered in the following groups or situations:

- Patients colonised with MRSA who are due to undergo an elective operative procedure especially high risk surgery e.g. cardiothoracic surgery, orthopaedic implant
- Patients in a clinical area where there is a high risk of colonisation leading to invasive infection e.g. the ICU/NICU
- If the risk of infection is high and the consequences severe e.g. immunosuppressed patients
- As part of a strategy to address uncontrolled transmission despite the use of other measures.

Grade C

Antimicrobial stewardship and the prevention and control of MRSA

Recommendation 27

Unnecessary or prolonged antibiotic use, particularly of broad-spectrum agents should be avoided. **Grade A**

Recommendation 28

Healthcare institutions should implement the recommendations included in the *Strategy for the Control of Antimicrobial Resistance in Ireland (SARI 2009)*. **Grade B**

Recommendation 29

Antibiotic stewardship programmes should be implemented in all healthcare settings including long-term care facilities. **Grade B**

Occupational health aspects of MRSA

Recommendation 30

Occupational health (OH) staff providing services to the healthcare sector should be familiar with the multifaceted approach required to manage MRSA in their workplace setting and of the need for a risk assessment approach in understanding the complex interplay between staff, patients and the environment. **Grade C**

Recommendation 31

The screening of staff on a routine basis is not indicated. Staff screening may be considered for institutions without endemic MRSA, or for specific high-risk units, as determined by the local IPCT. **Grade C**

Recommendation 32

Healthcare workers (HCW) should only be screened for MRSA infection or colonisation if they are epidemiologically linked to a cluster of MRSA infections. **Grade C**

2.2 Management

The following are responsible for implementation of recommendations 33-45: clinical teams, senior management and the Infection Prevention and Control Team (IPCT). Public health professionals and medical scientists have some specific roles as outlined in the relevant recommendations.

Management of MRSA including treatment and prophylaxis

Initial approach before treatment

Recommendation 33

Healthcare associated MRSA (HA-MRSA) infection should be considered in any patient exhibiting signs and symptoms of infection and who is known to have been previously infected or colonised with MRSA or to have risk factors for same. **Grade A**

Recommendation 34

Serious consideration should be given to the removal where feasible of in-situ devices/prosthetic material such as intravascular catheters, infected pacemakers, shunts, prosthetic joints and valves. **Grade C**

Choice of antimicrobial agents

Recommendation 35

An intravenous glycopeptide is the recommended treatment for patients with suspected serious/life-threatening MRSA infection (e.g. BSI) having due regard to the clinical judgement of the prescriber and the individual circumstances of each patient. Therapeutic options should be discussed with a clinical microbiologist or infectious disease physician on a case-by-case basis as necessary. **Grade C**

The role of glycopeptides

Recommendation 36

An initial vancomycin dose of 15mg/kg (based on actual body weight), not to exceed 2g, every 12 hours is suggested for patients with normal renal function. A loading dose of 25mg/kg (based on actual body weight), should be considered for seriously ill patients. It is essential that patients are given a dose appropriate to their weight and not just 1g every 12 hours when using vancomycin having due regard to the clinical judgement of the prescriber and the individual circumstances of each patient. Therapeutic options should be discussed with a clinical microbiologist or infectious disease physician on a case-by-case basis as necessary. **Grade D**

Recommendation 37

Subsequent dose adjustment should be based on trough serum vancomycin concentrations in order to achieve effective targeted therapeutic concentrations of vancomycin. **Grade C**

Recommendation 38

Vancomycin or teicoplanin are equally effective for most MRSA infections. It is unclear whether the lower adverse event rate associated with teicoplanin, including nephrotoxicity, should influence the choice of glycopeptides. **Grade A**

Duration of therapy

Recommendation 39

The duration of therapy will depend on the type of infection and the clinical response and should be discussed with a consultant microbiologist or infectious diseases physician. **Grade D**

Combination therapy

Recommendation 40

Despite other recent guidelines from North America that recommend the use of single agent therapy for the treatment of BSI infection or native valve endocarditis, combination therapy may be deemed necessary in certain clinical situations. Expert advice should be sought in these situations. **Grade D**

Surgical prophylaxis

Recommendation 41

A glycopeptide is indicated for surgical prophylaxis in adult patients undergoing implant surgery known to be MRSA positive or suspected/in a risk category for MRSA but have not being screened having due regard to the clinical judgement of the prescriber and the individual circumstances of each patient. Options should be discussed with a clinical microbiologist or infectious disease physician on a case-by-case basis as necessary. **Grade B**

Recommendation 42

Patients undergoing non-implant surgery where surgical prophylaxis is indicated should be prescribed a glycopeptide as part of their prophylaxis regimen if they are confirmed as being MRSA positive, having due regard to the clinical judgement of the prescriber and the individual circumstances of each patient. Options should be discussed with a clinical microbiologist or infectious disease physician on a case-by-case basis as necessary. **Grade A**

Use of newer anti-MRSA agents

Recommendation 43

The prescribing of newer anti-MRSA agents should be firmly controlled by reserving their use for glycopeptide failure, resistance or intolerance, or on the recommendation of a consultant microbiologist or infectious diseases physician. **Grade D**

Reduced susceptibility to glycopeptides

Recommendation 44

An agar screening plate BHIV6 (i.e. brain heart infusion agar containing 6 mg/L of vancomycin) is recommended for the detection of reduced susceptibility to glycopeptides in addition to standard methods i.e. disc diffusion or an automated method. If possible, laboratories should incorporate the vancomycin agar screen plate for testing all *S. aureus* isolates. Alternatively, the screening may be limited to MRSA isolates, since nearly all vancomycin-intermediate or vancomycin-resistant isolates are MRSA. **Grade D**

Recommendation 45

If clinical failure is suspected with glycopeptide therapy a minimum inhibitory concentration (MIC) should be performed and any isolate with an MIC of >2 mg/L referred to the Reference Laboratory. A macro-method using both vancomycin and teicoplanin should be performed. **Grade D**

2.3 Surveillance

Recommendation 46

Staphylococcus aureus BSI must be reported to the Health Protection Surveillance Centre (HPSC) on a quarterly basis, based on EARS-Net case definitions (statutory requirement).

Recommendation 47

All healthcare facilities should maintain a record of new cases of MRSA. Where possible, this should be maintained in an electronic format. The list should include the following details or core data:

- Patient identification
- Specimen site
- MRSA isolation site
- Date of first positive result
- Hospital/facility location at time of specimen collection (e.g. ward name)
- Date of admission. **Grade C**

Recommendation 48

All acute hospitals should participate in the *Staphylococcus aureus* component of the EARS-Net enhanced BSI surveillance system. **Grade D**

Recommendation 49

Outbreaks of infection caused by MRSA must be notified to the local Medical Officer of Health (MoH), Department of Public Health (DPH) (statutory requirement).

Recommendation 50

The local DPH should be informed of individual cases of CA-MRSA infection under the categories listed below:

- Severe invasive disease for definitions or cases resulting in death
- Cases in high risk groups e.g. healthcare workers working in the community or in hospitals, those involved in gyms or close contact sports and teachers
- Cases in a closed community where there may be potential for onward transmission e.g. prison, military camps, nursing home. **Grade C**

2.4 Evaluation and audit

The following are responsible for implementation of the recommendations 51-53: clinical teams, senior management and the Infection Prevention and Control Team (IPCT). Public health professionals and medical scientists have some specific roles as outlined in the relevant recommendations.

Recommendation 51

All acute hospitals should report rates of new cases of hospital-onset and community-onset MRSA colonisation/infection at least twice per year to hospital management, clinical directors, clinicians and ward/unit managers. Rates should be expressed as new cases per 100 bed-days used. **Grade C**

Recommendation 52

All acute hospitals should carry out local surveillance of process indicators related to the control and prevention of MRSA. **Grade B**

Recommendation 53

Audit is recommended to support a continuous quality improvement process in relation to the implementation of the National Clinical Guideline - The Prevention and Control of Methicillin-resistant *Staphylococcus aureus* (MRSA). **Grade D**

3.0 National Clinical Guideline

3.1 Background

Methicillin-resistant *Staphylococcus aureus* (MRSA) is responsible for about 10% of all the healthcare-associated infections (HCAIs). Some of these infections are life-threatening e.g. BSI, and many result in considerable patient suffering and morbidity. While there has been a welcome decline in the number of cases of MRSA BSI in recent years, developments have occurred since the last set of national guidelines were issued in 2005. This guideline was developed by the RCPI Clinical Advisory Group on HCAI - Subgroup MRSA Guideline Committee. The multi-disciplinary guideline group has reviewed the last set of guidelines together with other published international guidelines in the interim, as well as the scientific literature, and produced a set of recommendations which reflect best practice and are drafted to improve the quality of patient care. The group is grateful to all those who provided constructive and helpful feedback during the review stage. This guideline will be reviewed again in 2016.

β -lactam antibiotics are the antibiotics of choice in treating staphylococcal infection. Methicillin is an example of a β -lactam antibiotic first used in the treatment of *S. aureus* infections in the 1950s and 1960s. In 1961 the first strain of MRSA was identified. Although methicillin is no longer in clinical use all β -lactam resistant *S. aureus* isolates are referred to as MRSA. MRSA has been prevalent in Irish hospitals for over thirty years with significant accompanying mortality. Much work was and is being carried out in this country on MRSA which has enhanced the understanding of the virulence features, clinical effects and epidemiology of this pathogen.

The prevention and control of MRSA is a global challenge and is important generally in the control of HCAIs. MRSA BSI rates have been shown to correlate with the hospital-wide prevalence of MRSA, and efforts to reduce the number of patients colonised with MRSA will also reduce BSI rates. MRSA control measures also increase the awareness of the importance of all HCAI and their implementation decreases the rates of other HCAIs.

3.2 Using this National Clinical Guideline

This document is intended to be relevant to healthcare professionals in acute hospitals, obstetrics and neonates, nursing homes/long stay residential units and the community. It is also relevant for hospital managers, risk managers and quality and patient safety personnel. This summary version includes the recommendations. The full version provides more detail on the National Clinical Guideline and is available from the website: www.patientsafetyfirst.ie. The references and bibliography as well as the appendices are available in the full version document.

3.3 Aim of the MRSA National Clinical Guideline

The purpose of this guideline is to enhance the safety and quality of patient care by reducing HCAIs, specifically those caused by MRSA, through a series of recommendations that reflect best international practice.

This includes efforts:

- to enhance and further improve the prevention and control of MRSA since the publication of previous guidelines in 2005
- to reduce further the prevalence of MRSA BSI and to prevent other serious infections such as SSTIs, respiratory tract, bone and joint infections caused by MRSA

- to improve the use of antibiotics specifically for MRSA infections and to contribute to other aspects of antibiotic stewardship
- to raise awareness amongst the public and all healthcare professionals about the measures required for prevention and control of HCAs, e.g. standard precautions and the importance of their implementation.

Implementation of this National Clinical Guideline should address a number of areas:

Patient/resident-centered care

The prevention and control of MRSA is a key priority for all healthcare providers. Patients and residents will be provided with early information about their MRSA status, there will be governance and reporting systems in place to provide assurance and national standards on HCAI infection prevention and control will be implemented.

Effective care

Systems and controls will be put in place to monitor compliance with national standards and to learn from incidents/outbreaks.

Education

Patients/residents and healthcare providers will be educated about the prevention and control of HCAI and MRSA.

Governance, leadership and management

Accountability and responsibility for MRSA prevention and control will be clearly defined with performance monitoring, cluster/outbreak management and the use of cost-effective strategies. Surveillance of HCAI and MRSA, appropriate microbiology services and antibiotic stewardship are key components of this.

3.4 Methodology

This guideline was developed by the RCPI Clinical Advisory Group on HCAI - Subgroup MRSA Guideline Committee. The guideline group comprised of a multi-disciplinary team with wide geographic and professional spread. It met on a number of occasions over three years, with teleconferencing facilities being available to assist those contributing from outside Dublin. Efforts were made to ensure that all the relevant professional groups were represented and that the background of those involved included the acute hospital and community care settings.

The scientific literature was reviewed, especially that published since the previous 2005 guidelines, as well as a number of other international guidelines in the area, e.g. the management and treatment of MRSA infections. However, much of the literature on the prevention and control of HCAI relies on outbreak reports and observational studies rather than RCTs. The preparation of a draft guideline was carried out after achieving consensus amongst the guideline development group members. All the recommendations, and for those areas where no recommendations were made, were agreed by all members of the guideline development group.

The draft guideline was actively distributed and made available for a wide consultation exercise which involved the active soliciting of feedback from a variety of groups e.g. colleges, professional societies and patients. The consultation was designed to be comprehensive compensating for any gaps in representation on the guideline development group. This consultation exercise included health service managers and two external reviewers, one from the UK and the other from Australia, with expertise in MRSA prevention and control. All ensuing feedback was considered and if deemed appropriate incorporated into the final draft document.

3.5 Economic impact report

The guideline development group examined the economic impact of the guideline. In addition a budget impact analysis was completed with the support of HIQA. This analysis supports the clinical guideline recommendations and is presented in the full version document.

3.6 Guiding principles for the National Clinical Guideline

The following are guiding principles identified as part of the National Clinical Guideline:

- Every effort should be made by all healthcare professionals to minimise HCAI, including MRSA, in every healthcare setting through best professional practice.
- Recognising patients at-risk of MRSA colonisation and infection is an important component of safe patient care.
- Communication with patients and between healthcare practitioners in all healthcare settings is essential in the implementation of this guideline.
- Collaboration between clinical teams and experts in infection, i.e. clinical microbiologists and infectious disease physicians, is strongly recommended in the management of MRSA infections requiring antibiotic treatment.
- On-going surveillance of MRSA rates and any changing patterns of infection or antibiotic resistance remains important.

3.7 Implementation and dissemination

This guideline will be disseminated through the HSE networks and via professional organisations to infection prevention and control teams to optimise compliance in acute hospital and community settings. The subject matter will be made available online and used in educational sessions for healthcare professionals such as at staff induction. This summary version, in addition to the full version, which provides more detail on the National Clinical Guideline, is available on the website www.patientsafetyfirst.ie

3.8 Roles and responsibilities

Each healthcare professional has a role to play in minimising HCAI through adherence to best practice, e.g. optimal hand hygiene compliance. The guideline should be reviewed by key healthcare professionals in the clinical programmes to ensure that the prevention and control of MRSA is included as a patient safety issue and to help contribute to the quality of patient care.

3.8.1 Organisational responsibility

Within each organisation corporate responsibility is required for the implementation of the National Clinical Guideline to ensure that there is a system of care in place for the prevention and control of MRSA.

3.8.2 All clinical staff

All clinical staff should comply with this National Clinical Guideline and related policies, procedures and protocols. Clinical staff should adhere to their professional scope of practice and maintain their competency, in the prevention and control of MRSA. In using this guideline professional healthcare staff must be aware of the role of appropriate delegation.

3.9 Key audit criteria

To ensure that this guideline positively impacts on patient care, it is important that it is audited. Audit is recommended to support continuous quality improvement in relation to the implementation of the National Clinical Guideline - The Prevention and Control of Methicillin-resistant *Staphylococcus aureus* (MRSA).

The following are examples of audit criteria which are consistent with HIQA *National Standards for the Prevention and Control of Healthcare Associated Infections* (2009):

- Adherence to environment management standards (*Standard 3*)
- Written communication of MRSA status to patients, general practitioners and other healthcare professionals, e.g. on patient transfer (*Standard 5*)
- Hand hygiene compliance (*Standard 6*)
- Appropriate screening of at-risk groups (*Standard 7*)
- Isolation or cohorting of known positives or high-risk groups of patients for MRSA (*Standard 7*)
- Incorporation of an antibiotic with activity against MRSA for routine surgical prophylaxis in those patients known to be MRSA positive or at-risk of MRSA (*Standard 7*)
- Optimal empiric antibiotics for patients with suspected MRSA infection (*Standard 12*).



Abbreviations

Abbreviations within the context of this document.

BHIV6	Brain Heart Infusion with Vancomycin at 6 mg/l
BSI	Bloodstream Infection
CA-MRSA	Community-Acquired MRSA
EARS-Net	European Antimicrobial Resistance Surveillance Network
HA-MRSA	Healthcare-Associated MRSA
HCAI	Healthcare-Associated Infection
HCW	Healthcare Worker
HPSC	Health Protection Surveillance Centre
HSE	Health Service Executive
ICU	Intensive Care Unit
IPCT	Infection Prevention and Control Team
MIC	Minimum Inhibitory Concentration
MRSA	Methicillin-Resistant <i>Staphylococcus aureus</i>
NICU	Neonatal Intensive Care Unit
OH	Occupational Health
PPE	Personal Protective Equipment
RCPI	Royal College of Physicians of Ireland
RCT	Randomised Controlled Trials
SARI	Strategy for the control of Antimicrobial Resistance in Ireland
SSTI	Skin and Soft Tissue Infection



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